CLAIMS

What is claimed is:

1. A method for maintaining a map of node relationships for a network of related nodes, the method comprising the steps of:

detecting a change of a relationship between a first network node and a second network node having a child relationship to the first network node;

generating a change relationship signal indicating the change of the relationship between the first network node and the second network node; and

transmitting the change relationship signal to a parent node of the first network node so that the parent node receives an update of a state of the relationship between the first network node and the second network node.

2. The method of claim 1, wherein the step of generating the change relationship signal comprises generating the change relationship signal having a sequence number indicating a number of relationship changes of the second network node.

3. The method of claim 2, wherein the sequence number is a count of parents of the second network node.

4. The method of claim 1, further comprising the step of:

updating the map of node relationships based on the change relationship signal such that the map of node relationships indicates the state of the relationship between the first network node and the second network node.

5. The method of claim 1, further comprising the steps of:

receiving a propagated change relationship signal indicating a change in a relationship between two network nodes other than the first network node; and

transmitting the propagated change relationship signal to the parent node, so that the parent node receives an update of a state of the relationship between the two network nodes.

6. The method of claim 5, further comprising the step of:

updating the map of node relationships based on the propagated change relationship signal such that the map of node relationships indicates the state of the relationship between the two network nodes other than the first network node.

7. The method of claim 1, further comprising the steps of:

receiving a plurality of propagated change relationship signals indicating a change of relationship between two network nodes, each propagated change relationship signal having a sequence number;

comparing the sequence numbers for the propagated change relationship signals;

selecting one of the propagated change relationship signals with which to update the map of node relationships based on the step of comparing the sequence numbers; and

transmitting the selected one of the propagated change relationships signals to the parent node, so that the parent node receives an update of a state of relationship between the two network nodes.

8. The method of claim 1, wherein the change relationship signal is a termination signal indicating the termination of the relationship between the first network node and the second network node.

9. The method of claim 1, wherein the change relationship signal is a creation signal indicating the creation of the relationship between the first network node and the second network node.

10. The method of claim 1, wherein the step of detecting the change of the relationship comprises initiating a check-in communication from the second network node to the first network node.

11. A computer system comprising:

a processor;

a memory; and

an interconnection mechanism coupling the processor and the memory;

wherein the memory is encoded with logic instructions for a map maintainer application that, when performed on the processor, cause the processor to form a map maintainer that maintains a map of node relationships for the network by performing the operations of:

detecting by the processor a change of a relationship between a first network node and a second network node having a child relationship to the first network node;

generating a change relationship signal in the memory indicating the change of the relationship between the first network node and the second network node; and

transmitting the change relationship signal to a parent node of the first network node so that the parent node receives an update of a state of the relationship between the first network node and the second network node.

12. The computer system of claim 11, wherein the change relationship signal has a sequence number indicating a number of relationship changes of the second network node.

13. The computer system of claim 12, wherein the sequence number is a count of parents of the second network node.

14. The computer system of claim 11, wherein the logic instructions for a map maintainer application that, when performed on the processor, cause the processor to form a map maintainer comprise further logic instructions that, when performed on the processor, cause the map maintainer to perform the operation of updating the map of node relationships based on the change relationship signal such that the map of node relationships indicates the state of the relationship between the first network node and the second network node.

15. The computer system of claim 11, wherein the logic instructions for a map maintainer application that, when performed on the processor, cause the processor to form a map maintainer comprise further logic instructions that, when performed on the processor, cause the map maintainer to perform the operations of:

receiving a propagated change relationship signal indicating a change in a relationship between two network nodes other than the first network node; and

transmitting the propagated change relationship signal to the parent node, so that the parent node receives an update of a state of the relationship between the two network nodes.

16. The computer system of claim 15, wherein the logic instructions for a map maintainer application that, when performed on the processor, cause the processor

to form a map maintainer comprise further logic instructions that, when performed on the processor, cause the map maintainer to perform the operation of updating the map of node relationships based on the propagated change relationship signal such that the map of node relationships indicates the state of the relationship between the two network nodes other than the first network node.

17. The computer system of claim 11, wherein the logic instructions for a map maintainer application that, when performed on the processor, cause the processor to form a map maintainer comprise further logic instructions that, when performed on the processor, cause the map maintainer to perform the operations of:

receiving a plurality of propagated change relationship signals indicating a change of relationship between two network nodes, each propagated change relationship signal having a sequence number;

comparing the sequence numbers for the propagated change relationship signals;

selecting one of the propagated change relationship signals with which to update the map of node relationships based on the step of comparing the sequence numbers; and

transmitting the selected one of the propagated change relationships signals to the parent node, so that the parent node receives an update of a state of relationship between the two network nodes.

18. The computer system of claim 11, wherein the change relationship signal is a termination signal indicating the termination of the relationship between the first network node and the second network node.

19. The computer system of claim 11, wherein the change relationship signal is a creation signal indicating the creation of the relationship between the first network node and the second network node.

20. The computer system of claim 11, wherein the second network node initiates a check-in communication from the second network node to the first network node.

21. A computer program product that includes a computer readable medium having instructions stored thereon for maintaining a map of node relationships for a network, such that the instructions, when carried out by a computer, cause the computer to perform the steps of:

detecting a change of a relationship between a first network node and a second network node having a child relationship to the first network node;

generating a change relationship signal indicating the change of the relationship between the first network node and the second network node; and

transmitting the change relationship signal to a parent node of the first network node so that the parent node receives an update of a state of the relationship between the first network node and the second network node.

22. A computer system for maintaining a map of node relationships for a network of related nodes, the computer system comprising:

means for detecting a change of a relationship between a first network node and a second network node having a child relationship to the first network node;

means for generating a change relationship signal indicating the change of the relationship between the first network node and the second network node; and

means for transmitting the change relationship signal to a parent node of the first network node so that the parent node receives an update of a state of the relationship between the first network node and the second network node.

23. In a computer system, a method for maintaining a map of node relationships for a network of related nodes, comprising the steps of:

receiving a change relationship signal indicating a change in a relationship between a first network node and a second network node having a child relationship to the first network node;

locating, in the map of node relationships, an entry corresponding to the second network node; and

modifying the entry based on the change relationship signal so that the map of node relationships reflects the change in the relationship between the first network node and the second network node.

24. The method of claim 23, further comprising the steps of:

setting up a relationship to an alternate first network node capable of receiving the change relationship signal; and

activating the alternate network node so that the alternate first network node receives the change relationship signal and performs the steps of locating the entry and modifying the entry.

25. The method of claim 23, further comprising the steps of:

receiving a request for data;

selecting a network node capable of responding to the request based on the map of node relationships and the request; and

directing the request to the network node to provide a response to the request.

26. A computer system comprising:

a processor;

a memory comprising a map of node relationships for the network; and

an interconnection mechanism coupling the processor and the memory;

wherein the memory is encoded with logic instructions for a map maintainer application that, when performed on the processor, cause the processor to form a map maintainer that maintains the map of node relationships by performing the operations of:

receiving a change relationship signal indicating a change in a relationship between a first network node and a second network node having a child relationship to the first network node;

locating, in the map of node relationships in the memory, an entry corresponding to the second network node; and

modifying the entry based on the change relationship signal so that the map of node relationships in the memory reflects the change in the relationship between the first network node and the second network node.

27. The computer system of claim 26, wherein the logic instructions for a map maintainer application that, when performed on the processor, cause the processor to form a map maintainer comprise further logic instructions that, when performed

on the processor, cause the map maintainer to perform the operations of:

setting up a relationship to an alternate first network node capable of receiving the change relationship signal; and

activating the alternate network node so that the alternate first network node receives the change relationship signal and performs the steps of locating the entry and modifying the entry.

28. The computer system of claim 26, wherein the logic instructions for a map maintainer application that, when performed on the processor, cause the processor to form a map maintainer comprise further logic instructions that, when performed on the processor, cause the map maintainer to perform the operations of:

receiving a request for data;

selecting a network node capable of responding to the request based on the map of node relationships and the request; and

directing the request to the network node to provide a response to the request.

29. A computer program product that includes a computer readable medium having instructions stored thereon for maintaining a map of node relationships for a network, such that the instructions, when carried out by a computer, cause the computer to perform the steps of:

receiving a change relationship signal indicating a change in a relationship between a first network node and a second network node having a child relationship to the first node;

locating, in the map of node relationships, an entry corresponding to the second network node; and

modifying the entry based on the change relationship signal so that the map of node relationships reflects the change in the relationship between the first network node and the second network node.

30. A computer system for maintaining a map of node relationships for a network of related nodes, the computer system comprising:

means for receiving a change relationship signal indicating a change in a relationship between a first network node and a second network node having a child relationship to the first node;

means for locating, in the map of node relationships, an entry corresponding to the second network node; and

means for modifying the entry based on the change relationship signal so that the map of node relationships reflects the change in the relationship between the first network node and the second network node.